



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/914,103	08/22/2001	Chang Je Cho	P/2803-42	9636
2352	7590	02/09/2005	EXAMINER	
OSTROLENK FABER GERB & SOFFEN 1180 AVENUE OF THE AMERICAS NEW YORK, NY 100368403			MONDT, JOHANNES P	
			ART UNIT	PAPER NUMBER
			2826	

DATE MAILED: 02/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/914,103

Applicant(s)

CHO, CHANG JE

Examiner

Johannes P. Mondt

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 November 2004.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

***Response to Amendment***

Amendment filed 11/12/2004 forms the basis of this official action. In said Amendment Applicant substantially amended claims 1-10 through substantial amendment of independent claim 1.

Comments on "Remarks" in said Amendment can be found below under "Response to Arguments".

### ***Specification***

The following objection to the Specification is a verbatim repetition of the objection to the Specification included in the previous official action. Applicant is specifically reminded of the final three sentences of this objection.

Applicant's statement that his invention contradicts the second law of thermodynamics and the rectifying function of the device as being able to operate without supply of energy are unsubstantiated, considering the absence of a plot of entropy as a function of time or the equivalent of it. Applicant should provide that plot in a manner that enables a straightforward verification of said statement or withdraw all reference to the device as a rectifier and the rectifying function of said device in the sense given to this term by Applicant, namely as a device and function, respectively, capable of defying the second law of thermodynamics, to operate without the supply of energy, or the physical equivalent of such statements.

2. Furthermore, the specification is inconsistent with the Declaration under 37 C.F.R. 1.132 referred to above:

The material characterization of the "metal particles" is in stark contrast with said Declaration, because Ge (i.e., germanium) is not a metal but instead is a semiconductor (see page 1, step 5, ad 1.1 and page 2, step 2 ad 1.2); while nothing in either the original specification or the aforementioned Declaration explains how the metal particles are uniformly distributed (page 35, lines 10-15), or even how they are made to be of uniform size (page 35, lines 10-15), *a fortiori* not how the metal particles are regularly dispersed (cf. page 36, lines 3-6). Great effort is required to provide any regularity of an

array of nano-sized particles because the scale of regularity necessarily also is in the nanometer range, while nothing is mentioned about how this is arranged.

Applicant should resubmit the specification with all material pertaining to the above mentioned objections fully removed.

**Appropriate action is required.**

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. ***Claims 1-10*** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claims contain subject matter not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. In particular claim 1 contains the limitation that "ambient temperature of said apparatus in a thermal equilibrium state is converted by itself so that said apparatus continuously produces DC electromotive force". Nothing in the Specification indicates how ambient temperature of said apparatus in thermal equilibrium is converted *by itself* so that said apparatus continuously produces DC electromotive force, while such conversion as admitted and stressed by Applicant in his Specification would constitute "a contradiction with the second law of thermodynamics". The characterization of the apparatus as "in a thermal equilibrium state" has not been shown to be correct, and, in fact, is known not to

Art Unit: 2826

be correct: any apparatus by definition needs constructing, which already implies a non-equilibrium state. In the underlying case, a fortiori, said apparatus comprises an aggregate of different materials. Nothing in the Specification shows how an aggregate, consisting of materials with different thermodynamic potentials, can possibly be in thermodynamic equilibrium: the Specification does not provide any prescription for it, while differences in thermodynamic potentials within a substance, or gradients in the thermodynamic potential within a substance, constitute an important form of non-equilibrium force (see e.g. de Groot and Mazur, "Non-Equilibrium Thermodynamics", Dover Publishing Co., 1984 (original: North-Holland Publishing Co., 1961), Chapter III).

Applicant has contained no comparison with standard theory including a mathematical statistics analysis or error analysis to show that said conversion indeed occurs "by itself", rather than being driven by thermodynamic forces known in the art. Said comparison would necessarily involve an error analysis in which the conversion by itself as claimed would be shown to exceed the overall error bar that incorporates the effect of measurement errors, imperfect thermal insulation of said apparatus, and the relative order of competing non-equilibrium effects such as current driven by thermodynamic potential gradients or differences. Therefore, to ascertain whether one ordinarily skilled in the art could use the invention as claimed would require the needed experimentation to discover how said conversion could possibly occur by itself. In view of the circumstance that there has never been a case in which the second law of thermodynamics has been contradicted by experimental results considering *the present state of the art*, said needed experimentation is undue and unreasonable. Furthermore,

*ordinary skill in the art* is not enough to carry out said needed experimentation, because there is a difference between the disciplines of electrical engineering and experimental statistical physics. Although Applicant has supplied further details of the method of manufacturing his apparatus through Affidavit 1.132 filed 3/11/2003 and through Responses to Office Actions mailed 3/20/2002 and 7/14/2003 said further details fail to show how the aforementioned limitation is enabled; if anything they show a lack in the *amount of direction by inventor* with regard to the directions how to manufacture the device as given in the Specification.

The essence of the claimed conversion resides, as judged from the Specification and from aforementioned Affidavit and Responses in the claimed nano-particles layer "in which a plurality of conductive and of a predetermined minute size, nano particles (sic) that are insulated from each other, are arranged as a substantially regularly and uniformly dispersed single layer" has "electrical contact with said first charge movement barrier layer". This implies that indeed the contradiction to the second law of thermodynamics is to be found among an extremely wide variety of material embodiments, as all materials can be broken down to the nano-level, while all metals, semimetals and semiconductors must be characterized as conductive. Furthermore, especially in view of the needed comparison with standard theory the nano-particles are ill-defined in size, despite certain indications of a range including 2 to 5 nm. For instance, a Ge sphere of 2 nm only contains fewer than 200 atoms, but a Ge sphere of 5 nm already contains about 3,000 atoms, approaching the physically infinitesimal size needed for the justification of a continuum description used in thermodynamic

considerations and based on standard statistical physics underpinning. Therefore, Applicant's conditions vary widely indeed. In summary, then the examiner notes the claimed subject matter not to have been disclosed along *the breadth of the claims*.

As to *the nature of the invention*, it is nothing short of a *perpetuum mobile*, claimed but not enabled, the very essence of the finding (the electromotive force) not having been quantitatively juxtaposed with standard theoretical predictions for the same apparatus based on an overwhelmingly substantiated body of knowledge and experimental experience that supports the second law of thermodynamics.

Applicant has provided *no existing working models*.

Examiner, in view of the above, concludes that *the quantity of experimentation needed to make or use the invention based on the content of the Specification is unreasonably large*.

Examiner concludes in view of the above, that the lack of enablement of Applicant's invention implies a lack of its utility.

### ***Claim Rejections - 35 USC § 101***

3. ***Claims 1-10*** are rejected under 35 U.S.C. 101 because the claimed invention is not supported by either a specific asserted utility or a well established utility.

In the absence, in the Specification, of reproducible and statistically meaningful data in support of Applicant's statement that the "apparatus" device of claims 1 – 9 and the "method of obtaining a desired DC electromotive force" of claim 10 contradicts the second law of thermodynamics, said "apparatus" of claims 1 – 9 and said "method of



obtaining a desired DC electromotive force” of claim 10 lack enablement, as detailed above under item 2. In view of this lack of enablement, said “apparatus” of claims 1-9 and said “method of obtaining a desired DC electromotive force” of claim 10 are also lacking in patentable utility as neither a specific asserted utility nor a well established utility can be derived from the Specification.

N.B.: Claims 1-10 also rejected under 35 U.S.C. 112, first paragraph.

Specifically, since the claimed invention is not supported by either a substantial asserted utility or a well established utility for the reasons set forth above, one skilled in the art clearly would not know how to use the claimed invention. See above under 35 USC 112, first paragraph.

### ***Response to Arguments***

4. Applicant's arguments filed 11/12/04 have been fully considered but they are not persuasive.

With regard to the traverse of the rejection under 35 USC 101 (pages 6-7), Applicant's traverse does not even address the reasons given in the rejection, namely: the lack of enablement as discussed in the rejection under 35 USC 112, first paragraph, also included in the previous office action mailed 05/06/04, in which it was clearly stated that in the absence of reproducible and statistically meaningful data in support of Applicant's statement that the apparatus device of claims 1-9 including the method of obtaining a desired DC electromotive force of claim 10 depending on said device contradicts the second law of thermodynamics the invention lacks enablement and

Art Unit: 2826

thereby a specified asserted utility or well established utility. The arguments in support of the examiner's position and as laid down in the previous response to arguments have been amply elaborated previously, are hereby included by reference and need no explicit verbal repetition. In short, the device has no utility in the absence of enablement. Examiner notes the surprising statement that Applicant's invention merely appears to be a "physical structure", while in the specification and the claims said physical structure "continuously produces a DC electromagnetic force" (claim 1 and all other pending claims by dependency). Parenthetically, Applicant is referred to the heading reproduced above the rejections under 35 USC 101, from which it is clear that Applicant's evident presumption that any physical structure suffices for a patent is not correct. Applicant is referred to the previous office action and to the rejections below under 35 USC 101 for said heading. In view of the above, the rejections under 35 USC 101 must be made to stand.

With regard to the traverse of the rejections under 35 USC 112, first paragraph, for failing to comply with the enablement requirement, Applicant alleges that "the claimed structure of the invention" "undeniably produces the continuous DC electromotive force", which is exactly what has for years been the issue between Applicant and the examiner: All arguments made previously appear to have had no effect upon the state of the Application, given the absence of any amendment to the Specification and the persistent inclusion in the claim language of claimed subject matter that lacks enablement.

Applicant's characterization of the position of the examiner on page 8 is incorrect through its lack of completeness. Although the ultimate basis of the second law of thermodynamics is indeed empirical, any physical process (and hence any physical structure claimed or disclosed to produce said physical process) that is claimed or disclosed to violate said second law of thermodynamics calls, because of its uniqueness, a commensurate degree of scrutiny and information means for its verifiability. Applicant has provided none and has done nothing to remove the grounds for said rejections, neither by amendment to the Specification, nor by Amendment to the claim language. Therefore, the text of page 16 in this regard in the previous office action is herewith included by reference.

Applicant's argument ad 1 (pages 8-9) is irrelevant to the status of the application: no Oath/Declaration containing expert Affidavit under 37 C.F.R. 1.132 has been received to date.

Applicant's argument ad 2 (pages 9-12) is incorrect, because a difference in electrochemical potential between two abutting metals causes a flow of electrons between said metals. See the references provided in the previous office actions, from which it is clear that a gradient in said electrochemical potential has the same electrical effect as a temperature gradient; see in particular Eq. 78 on page 350 of S.R. de Groot and P. Mazur, *loc.cit.* Applicant is reminded that the term "electrochemical potential" when applied to systems charge carriers comprises the contribution from the electrons, including the conduction electrons (see, e.g., Academic Press Dictionary of Science and Technology, Ed. C. Morris, Academic Press, Inc. 1992, page 723), which is what counts

for the establishment of an electrical field and electrical current. In other words: comprised is the energy it takes to move one electron from a conduction band of a first metal to infinity, which when less/greater than the energy it takes to move one electron from an abutting second metal to infinity leads to a current to/away from said first metal. Once again, with regard to Applicant's remarks on page 11 included in argument ad 2, ("with all due respect...") gradients in the electrochemical potential constitute just as much a deviation from thermodynamic equilibrium as does a temperature gradient. Examiner has referred in this regard to the sources for entropy production. See, for instance Eq. (21) on page 24 in S.R. de Groot and P. Mazur (loc. cit.). Examiner submits with regard to the reference to "Battery Handbook" that it is unreasonable from Applicant to refer to non-English language texts unless an English explanation or translation is provided, which Applicant has not done. Because ion movement is irrelevant to either party's arguments (see above comments on the meaning of electrochemical potential) Applicant's comments on lines 3-21 are irrelevant as well. And, with regard to the comments on page 12, in the final paragraph, both electric voltage and current are present in the thermo-electric balance equation (78) on page 350. Applicant's allusion to a "vague possibility" should perhaps be gauged in terms of his reluctance to provide a proper error analysis, in which terms said possibility is neither established nor refuted and thus indeed just as vague as Applicant's allegations as claimed and disclosed on the violation of the second law of entropy. However, once again: it is Applicant's burden to show reasonable grounds for these allegations,

considering their unique status in the entire world of physics and technology when substantiated.

With regard to Applicant's argument ad 3 (pages 13-16) Applicant's remarks that since his invention "is directed to a conversion device which converts heat into electrical energy, in which heat source from a single temperature can be converted into electrical energy" "it is therefore unreasonable to attempt to appreciate the present invention through the conventional thermodynamic principles" fully misses the point made in all previous official actions to date that Applicant needs to disclose how his application is enabled. Examiner does not require Applicant to hold on to conventional physics, but instead does insist Applicant show his results in quantitative manner against the backdrop of conventional physics, which logically involves standard error analysis. Applicant's comments that "the possibility for such a device has been known for around 120 years as Maxwell's Demon fully misunderstand Maxwell's Demon, which is merely a Gedankenexperiment. With regard to the comments as though examiner does not "stand neutral" (page 15), as mentioned before, the examiner does not discard Applicant's allegations off hand but does insist on a thorough measurement analysis while Applicant does not even meet standards for experiments not involved in the type of extraordinary claims as those of Applicant. As to the comments by Applicant on the "non-equilibrium factor" Applicant misinterprets "failing", because he has neither proved nor disproved, at this point, whether his claim is correct, this by dearth of said measurement analysis. For these reasons the comments ad 3 are rejected as wholly unpersuasive.

With regard to the comments ad 4 Applicant's entire enumeration of the error range foregoes any other sources in the entropy source strength other than due to temperature gradients and hence on that count alone is highly incomplete, given the other sources, such as exist in the presence of gradients in the electrochemical potential. For these reasons said comments are rejected as not persuasive.

With regard to the comments ad 5 once again appears to believe that no other conditions are required beyond a homogeneous temperature for thermal equilibrium. This is not true: again Applicant is most respectfully referred to the literature on entropy sources as given before (*loc.cit.*). In short: thermal equilibrium does not preclude the existence of many sources of non-equilibrium flow including magnetic even in a most simple description in agreement with the second law of thermodynamics, said source including the ones cited in the previous office action, which shall hereby have no need of regurgitation. Suffice it to say with regard to the comments on page 18 that "thermal equilibrium" in Applicant's explanation evidently is defined by constant and uniform temperature but is then inferred to have no entropy source strength, in contrast with the physical evidence on the existence of a plurality of diverse thermodynamic forces (S.R. deGroot et al, *loc.cit.*).

For the above reasons the comments in said Amendment utterly fail to persuade. Finally, Applicant has neither provided items ad a) and b) as described on page 4 of the previous office action, nor has Applicant amended the Specification as required for removal of the objection to said Specification. Therefore, the rejections are made to stand, after consideration of the substantial amendments to all claims through the

substantial amendment to claim 1, which substantial amendment however does nothing to remove the reasons for said rejections.

***Conclusion***

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Johannes P. Mondt whose telephone number is 571-272-1919. The examiner can normally be reached on 8:00 - 18:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J. Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2826

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JPM

February 4, 2005

Patent Examiner:

  
**NATHAN J. FLYNN**  
**SUPERVISORY PATENT EXAMINER**  
Johannes Mendt (Art Unit: 2826), Ph. D.  
**TECHNOLOGY CENTER 2800**